



NEW JERSEY COMMISSION ON
BRAIN INJURY
RESEARCH

**DIRECTORY OF GRANT AWARDS
2009 GRANT CYCLE**

NEW JERSEY COMMISSION ON BRAIN INJURY RESEARCH

This data was compiled in compliance with the New Jersey Commission on Brain Injury Research's statutory mandate, N.J.S.A. 52:9EE-1 "...to compile a directory of brain injury research being conducted in the State."

The information contained within this directory is not all-inclusive. The research projects and researchers listed in this directory are all based in the State of New Jersey and have applied to and received funding during the fiscal year 2009 grant cycle. The research projects are not categorized, or listed in any particular order.

This directory is not a complete listing of all scientific research being performed within the State of New Jersey due to the proprietary nature of the research being conducted at various institutions throughout the State. In addition, institutions are not obligated to share their research information with the New Jersey Commission on Brain Injury Research.

Please feel free to contact the New Jersey Commission on Brain Injury Research at P.O. Box 360, 369 S. Warren Street, Trenton, New Jersey, 08625. The Commission's office can be reached by telephone at 609-633-6465, by fax at 609-943-4213, or by e-mail at NJCBIR@doh.state.nj.us.

For information on the New Jersey Commission on Brain Injury Research's grant award process, grant applications and deadlines, please see: www.state.nj.us/health/njcbir.

2009 MEMBERSHIP INFORMATION

Richard K. Burns, M.D.
Meiling Chin, M.B.A.
Keith Cicerone, Ph.D.
Emanuel DiCicco-Bloom, M.D.
Karl Herrup, Ph.D.
Cynthia Kirchner, M.P.H.
John LoCurto, M.D.
Nicholas Ponzio, Ph.D.
Ed Sullivan
Dennie Todd

COMMISSION PERSONNEL

Dennis Benigno, Executive Director
Toni Tucker, Administrative Assistant

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BRAIN INJURY RESEARCH**

2009 GRANT CYCLE

**DIRECTORY OF GRANT AWARDS FOR
BRAIN INJURY RESEARCH**

JUNE 2009

NEW JERSEY COMMISSION ON BRAIN INJURY RESEARCH

GRANT AWARDS

INDIVIDUAL RESEARCH GRANT RECIPIENTS:

John E. Pintar, Ph.D. – Principal Investigator

University of Medicine & Dentistry of New Jersey - Robert Wood Johnson Medical School

Grant Award: \$330,000

Proposal Title: *Role of IGF Binding Proteins in Response to Brain Injury*

Traumatic brain injury leads to multiple changes in gene expression by cells within and surrounding the injured tissue, although the functional significance of most of these changes remains poorly understood. There is strong evidence indicating that the peptide "insulin-like growth factor I" (IGF-1) can both be neuroprotective and perhaps also stimulate cell division of stem cells that could replenish injured neural tissue.

Thus, it is important to understand how IGF activity is regulated. One set of proteins that regulate the activity of IGF-I is the insulin-like growth factor binding protein (IGFBP) family, which is up-regulated in several models of brain injury including the controlled compression injury model (CCI) of TBI. We propose to determine the functional role of IGFBP upregulation by determining whether alterations from the normal response to TBI occur in mutant strains of mice already produced in our laboratory that lack these proteins. We will focus in particular on IGFBP-2, where significant up-regulation at the injury site occurs following CCI TBI. We will perform CCI TBI in wild-type and IGFBP mutant mice and compare the extent of microglial invasion, neural and glia apoptosis, and stem/progenitor cell proliferation and differentiation between wild-type and mutant mice. Completing these studies will reveal specific processes dependent on IGF binding protein function. Thus, the proposed experiments will provide functional insight into the roles of the insulin-like growth factor system in neural maintenance and restoration and potentially lead to more efficacious treatments for TBI.

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Glenn Wylie, Ph.D. – Principal Investigator

Kessler Foundation

Grant Award: \$469,453

Proposal Title: *Advanced Brain Imaging in Traumatic Brain Injury*

In this project, we will investigate the extent to which the integrity of the connecting fibers in the brain predicts brain activity in patients with TBI. More specifically, patients with TBI will perform a battery of tests that measure working memory, processing speed, and motor function while in a magnetic resonance imaging (MRI) scanner, allowing us to collect functional MRI (fMRI) data. This is an index of brain activity associated with each task. We will also collect diffusion tensor imaging (DTI) data, which will allow us to measure the integrity of the connecting fibers throughout the brain. We will compare the DTI data from the TBI patients to DTI data from healthy control subjects to ascertain where TBI patients have deficits in the connecting fibers. After doing the same with the fMRI data, we will relate the DTI data and the fMRI data. This study will be the first to investigate precisely how damage to the connecting fibers affects activity in cortical regions.

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Vijayalakshmi Santhakumar, MBBS, Ph.D. – Principal Investigator

University of Medicine & Dentistry of New Jersey - New Jersey Medical School

Grant Award: \$451,124

Proposal Title: *Tonic GABAergic Inhibition after Traumatic Brain Injury: Role in Epileptogenicity*

There are over 1.5 million cases of civilian brain injuries in the US with over 12,000 annual cases in the state of New Jersey. Brain injury poses an increasingly significant health issue due to the wide spectrum of injury strengths and because even mild injuries can lead neurological disorders such as epilepsy and memory loss several years after the precipitating trauma. Post-traumatic neurological disorders pose a particularly huge problem in injured combat veterans, since the likelihood long-term neurological complications increases with the severity of injury. The goal of this project is to identify key changes in inhibitory mechanisms in the hippocampus that occur after brain trauma' and contribute to development of limbic disorders. Using a unique combination of experiments in an animal model of concussive brain injury and large-scale computational modeling, the project will determine the how brain injury alters steady-state inhibition in hippocampal circuits and identify their effect on epilepsy. The study will examine whether the use of drugs altering tonic inhibition given after injury could prevent the persistent post-injury increase in hippocampal excitability and development of epilepsy. In addition to identifying crucial mechanisms leading to epilepsy after brain concussion, the most common injury in traffic accidents, it is anticipated that the proposed studies will generate new treatment avenues to improve the long-term neurological outcome after traumatic brain injury. Such preventive strategies will greatly improve the quality of life of patients after brain injury and decrease the economic burden that this debilitating condition places on the state health care system.

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